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## Use of Snake Skins in Birds' Nests

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Shed snake skins are thin, flexible, and fairly tough and would seem excellent nesting material for many birds. More than thirty species of birds have been recorded as using shed snake skins in their nests. Strecker (1926, 1927) reviewed the question and his papers brought forth a number of additional comments and records (see list of references). The habit originally attracted attention because of the antipathy many birds have for snakes, and consequent surprise that birds would use shed snake skins. Later, it was realized that the shed snake skins undoubtedly were not recognized by birds as being part of snakes and the question of antipathy on the birds' part disappeared. But there still remained the question as to how it came about that such an unlikely material as shed snake skin became a regular component of the nests of some species of birds.

In the following, by considering the occurrence of this habit in the bulbuls, and viewing it against the background of nest building in some of the other numerous species of bulbuls (Family Pycnonotidae), I show it to be a natural outcome of a tendency for each to build a nest characteristic of its own species and different from that of every other.

Of the more than thirty species recorded as using snake skins in their nests, the following eight do so regularly:

Crested Flycatcher, *Myiarchus crinitus*, Family Tyrannidae; North America; nest in hole in tree; authority, Strecker (1927, p. 9).

Arizona Crested Flycatcher, *Myiarchus tyrannulus*, Family Tyrannidae; American; nest in a hole in a tree; Strecker (1927, p. 9).

Rifle Bird, *Ptilorhis paradiseus*, Family Paradisaeidae; Australian; nest an open cup; Strecker (1927, p. 9).

Tufted Titmouse, *Baeolophus bicolor*, Family Paridae; American; nest in a hole in a tree; Forbush (1929, p. 366).

Black-crested Titmouse, *Baeolophus atricristatus*, Family Paridae; American; nest in a hole in a tree; Strecker (1927, p. 9).

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Madagascar Bulbul, *Ixo cincla madagascariensis*, Family Pycnonotidae; Madagascar; nest an open cup; Rand (1936, p. 456) .

Bank Mynah, *Acridotheres ginginianus*, Family Sturnidae; India; nest in a hole in a bank; Strecker (1927, p. 9) .

Blue Grosbeak, *Guiraca caerulea*, Family Fringillidae; American; nest an open cup; Strecker (1927, p. 9) .

One of the early lines of thought centered around the origin of the shed snake skin and assumed that the bird recognized it as part of a snake. This led to discussion as to why the bird itself was not frightened of the snake skin, and the possibility of its using snake skin to frighten away possible predators. As Strecker (1926, 1927) stressed, and Whittle (1927) and Mayr (1927) reiterated, this assumption is undoubtedly erroneous; to the birds the snake skin is simply another type of material. Thus, in seeking for correlations we can ignore any bird-snake relationships. We can no more expect to find them than we can expect to find a relation between chipping sparrows (*Spizella passerina*), that use horse hair in their nests, and horses; or between road runners (*Geococcyx Californianus*) , that use flakes of cattle manure in their nests, and cattle; or tree swallows (*Iridoprocne bicolor*), that use chicken feathers for nesting material, and chickens beyond the obvious one that both must live in the same area.

The birds that use snake skins only occasionally in their nests may do so by chance. The snake skin happens to fit in with their type of nesting, and they happen upon one at the proper time. This seems especially evident with such species as the house wren (*Troglodytes aedon*) , that in addition to such traditional material as twigs, grass, feathers, and hair, may upon occasion use paper, nails, lead pencils and safety pins. Probably the list of species that occasionally use snake skins in their nests can be greatly lengthened.

But the frequency with which the eight species listed above use snake skins indicates that there is a strong specific tendency for the birds to seek out and use this material.

In considering possible correlations it must first be pointed out that it is not unusual for certain species of birds to use certain materials in certain ways. so that in restricted areas, at least, we can have keys for the identification of birds' nests. For example, in pairs of related birds with similar nests we find that the nest of the field sparrow (*Spizella pusilla*) has little hair in the lining, that of the chipping sparrow (*S. passerina*) , much hair; the orchard oriole (*Icterus spurius*) favors grasses, the Baltimore oriole (*I. galbula*) , fibers and string; the robin (*Turdus migratorius*) grass and mud, the wood thrush (*Hylocichla mustelina*) dead leaves and moss.

The fact that the snake skin may be left hanging out of the nest is not significant, for other material may also be left untidily so. Even if it were woven into the edge, as if for trimming, it would not necessarily mean much. The nest must have an edge. A length of snake skin would seem excellent material for this finishing edge. And we have other species that do use different material for the edge or outside finishing of the nest; e.g., the lichen-trimmed edge of the nest of the wood pewee (*Myiochanes virens*) and the green fruiting heads of grass about the entrance of the retort-shaped nest of the Sakalava weaver bird (*Foudia sakalava*).

Various other correlations have been sought. As an indication of avian relationship there is little of value here. While certain close relatives, such as the two species of crested flycatchers and the two titmice, do share the habit, its apparently random scattering through various families indicates it has a number of independent origins.

Geographical variation in the use of snake skins is shown by Strecker (1927, p. 6) to exist in the crested flycatcher (*Myiarchus tyrannulus*): one race (*magister*) has the habit well developed while another (*nelsoni*) has it little developed. This is interesting as showing geographical variation in nesting habits, comparable to the robins' not using mud in their nests in the extreme north of their range, as they do in most places.

The wide distribution of the species with this habit America, Asia, Madagascar, Australia indicates no general geographical correlation beyond the obvious one of presence of both birds and snakes.

The use of snake skins by hole-nesting birds has been emphasized. While it is true that five of the species using snake skins are hole nesters, three make open nests.

Recently in examining the nests of the Philippine bulbul (*Microscelis gularis*) collected for the Chicago Natural History Museum by Dr. D. S. Rabor, and of the black-headed bulbul (*Pycnonotus atriceps*) collected by Dwight Davis in Borneo, I was struck with the resemblance of certain dead, weathered leaves in the nests to the shed skins of snakes. This opened up a new line of thought. Might not a comparison of the type of materials in the nests of the numerous species of bulbuls in Asia and Africa be illuminating in this connection?

Bulbuls in general make simple, cup-shaped nests. In some species availability of material apparently plays an important part in what is used. In addition to natural materials thread, twine, lace and cloth have been recorded for some species. While the nests of many species have been described as typical bulbuls' nests, certain species have distinctive, little-varying features that may prove to be specific. The brown-capped geelgat (*Pycnonotus tricolor*) of East Africa has a nest in which material varies with the locality, except for the foundation which invariably is of small

twigs more or less bound together and secured in position by cobwebs (Jackson and Sclater, 1938, p. 853). The simple leaflove (*Pyrrhurus simplex*) of West Africa has a nest described as very similar to that of other West African Pycnonotidae but with one invariable mark of distinction: among the materials at the base or outside part are always a few dry tendrils of some vine (Bates, in Bannerman, 1936, p. 165) . Another species, in India, the finch-billed bulbul (*Spizixus cani f roes*) has a nest that can be told from that of any other Indian bulbul by its being made almost entirely of tendrils (Baker, 1922, p. 401) .

The lining, usually of fine soft material, may be distinctive as in the black bulbul of India (*Microscelis psaroides*) which is one of the very few species that employ pine needles as a nest lining (Baker, 1922, p. 371) ; the white throated bulbul (*Criniger tephrogenys*) that always lines its nest with red roots of ferns (Baker, 1922, p. 364) and Blyth's bulbul (*Xanthixus flavescens*) in which the lining is nearly always the flowering ends of a coarse grass, bright tan in color.

Dead leaves are used by many species in the base of the nest, or in the outside or edge of the nest. In a number of species a selection for color is shown, one species using a bright tan lining, and another using red roots have been mentioned. Another species, the yellow bulbul (*Otocompsa flaviventris*) nearly always uses tan colored materials amongst which dead leaves are always prominent (Baker, 1922, p. 398) . The brown-eared bulbul (*Hemixus flavala*) while it uses few leaves, nearly always chooses materials of tan color (Baker, 1922, p. 375) . The nests of the ruby-throated bulbul (*Pycnonotus gularis*) are small cups, outwardly composed of a mass of large, red, dead leaves (Baker, 1922, p. 416) . We have seen how certain species of bulbuls almost always use certain types of material such as pine needles, twigs, tendrils, dead leaves, tan leaves, red leaves, or shed snake skin. A snake skin is not very different in texture and color from some dead leaves. May it not be that the use of shed snake skins as nesting material by one species is comparable to the use of tan dead leaves or red dead leaves by other species? The biological significance would be the same to the bird suitable material of a certain sort without reference to the origin of the snake skin.

In conclusion, it seems that the use of shed snake skins by birds as material in nest building is a natural outcome of the tendency to use any suitable material available. Certain species have evolved tendencies to use certain special materials in their nests, materials different from those used by their near relatives, and shed snake skins in a number of cases happen to be one of these. The fact that a snake earlier used the skin is irrelevant and not of any more significance than the role of the sheep, rabbit, horse or chicken that provides wool, fur, hair or feathers

for certain other species. The question remaining is not why certain birds use snake skins, but the broader, more general one of why some species use nest materials that are characteristic for the species, and different from those of other, related species.

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